

March 77

## AN INVITATION TO COMPUTER-VIDEO ARTISTS

For the second consecutive year Innervision Media Systems Inc. will be inviting artists to work out projects using our computer controlled video imaging system. Interdisciplinary problem solving leading to the generation of new works in video will be stressed. These projects will bring together artists, system analysts or computer programmers, engineering consultants, and students. Artists selected will be awarded a stipend and access to the video imaging system. To complete the project post production can also be arranged through the Synapse Post Production Program. (see attached)

The Video Imaging System is a collection of digital and analog modules, video and audio hardware which can be arranged in many different ways. The arrangement would be determined by the desired result. Clearly the most exciting part of the system is played by the computer which can precisely control the modules in time as per your commands. The computer human link which facilitates this is a computer program named "Harpo". For more detail see Harpo Description and Operating Instructions enclosed.

Abstracts from a few of our projects include:

- Several drummers translated the ambient rhythms of the Vernal Equinox as the computer sensed this rhythm from the drums, it switched a video switcher as part of a cable system piece by Steve Muratory.
- A desire to utilize composer Skrjabin's "Prometheus" score as program material for the computer imaging system resulted in a visual tone poem by Jose Montes-Baquer.
- Video animation detailing the construction of solar and wind energy gathering equipment. Robert Charron.

With help from the National Endowment for the Arts and The New York State Council on the Arts we seek to broaden expression by developing new systems for artistic use.

Carl Geiger & Gerard Fountain

For more information contact:

Carl Geiger or

Gerard Fountain

Innervision Media Systems Inc.

Onativia Crossing

Lafayette N.Y. 13084

Our hardware facilities include: voltage controlled oscillators, precision ramp generators, quadrature oscillators, phase locked loops, envelope followers, envelope generators, sample and hold, comparators, balanced modulators, voltage controlled amplifiers, voltage controlled filters, keyboard & interface, mixers. Video wise we have color encoders video to digital converter 3 bits (8 levels) digital to video converter, computer controlled switcher, keyer and colorizer. The digital modules include counters, programmable logic elements, one shot multivibrators multiplexers, decoders, various digital to analog level translators, 8 and 12 bit digital to analog, analog to digital converters. Other equipment include a computer controlled raster manipulator, color cameras, video tape recorders, and a 4 channel audio tape recorder.

There are also circuit construction facilities in case a module we don't have is needed.

# 1976-1977 SYNAPSE ARTIST VISITATION PROGRAM

The Synapse Artist Visitation Program at Syracuse University is offering extensive possibilities for the creation of video works by artists from New York State. Proposals are being accepted for participation in the Color Studio Production Program and Post-Production Program to be held in the extensive media facilities of Syracuse University.

Although the Program is directed towards the creation of new video works, artists in all fields of expression are encouraged to submit proposals which also explore some unique aspects of video.

Stipends will be awarded to artists in the Watson Color Studio Production Program only. Responsibility for transportation and meals is left to each artist, but housing will normally be provided for Visiting Artists in the Color Studio Production Program. Housing for the Post-Production artists can sometimes be arranged for a nominal charge.

Proposals for the Color Studio Production Program will be reviewed upon their arrival. Early applications will receive first consideration. Whenever possible it is helpful to arrange some personal contact with the Synapse Staff to discuss each artist's plans.

Post-Production proposals will be accepted continuously, but time in this program is generally filled quickly.

Proposals should be specific and include a personal history of relevant technical and production experience. Please list the equipment required, the expected length of the tape and a list of software sources to be used with their technical quality. Please fill out and include the form attached with this announcement.

For more information about proposals and stipends, see individual program descriptions, or contact Synapse.

## 1 COLOR STUDIO PRODUCTION AT SYNAPSE WATSON STUDIO



For the fourth consecutive year, brief residencies in the Synapse Watson Color Studio are being offered for the creation of new video works. Associated portable production equipment, the two-way campus cable system and the adjacent Watson Theater make possible the realization of ideas requiring any number of special conditions.

Artists selected will be awarded a stipend and an amount of studio time based on the complexity of their project. In addition each artist will have access to post-production time in the Newhouse Communications Center. Please include an estimation of the time required for each on the attached form.

The following equipment is normally available for the Watson production program:

- 2 IVC 150 color cameras with IVC (3M) color encoders.
- 1 filmchain multiplexer with 35mm slide, super 8 and 16mm film capacity with IVC 90 color camera.
- 12 input, Telemation switcher with 6 input effects generator.
- Grass Valley chroma key, color background generator, and distribution amplifiers.
- Tektronix sync generator with genlock and color lock.
- 3M processing amplifier with dropout compensator, and genlock.
- 2 IVC 870 1" color VTR's with assemble and insert edit.
- Several half inch color and black and white VTR's. Shibaden/Shintron and Sony S.E.G. portable black and white production studios.
- Sony 1/2" color portapak.
- Two-way CATV modulation equipment.
- Basic lighting and audio systems.
- Additional special equipment can sometimes be secured.

## 2 POST-PRODUCTION PROGRAM AT THE NEWHOUSE COMMUNICATIONS CENTER

High quality editing, mixing, or preparation for broadcast are the goals of the Post-Production Program. Artists' proposals will be accepted based on the appropriateness of the project to the level of the technology available. This would include tapes that are to be broadcast or ones which require the inclusion of several different kinds of recorded information, numerous generations of video tape recording or the mixing of tape in "A and B roll" style.

Proposals from artists requiring these capabilities will be accepted through June 1, 1977 and scheduled as time permits. Unfortunately, there are no stipends for this program. In most cases a rough edit in half-inch or three-quarter inch will be expected for tapes originating in those formats.

Here is a list of equipment normally available for the Post-Production Program:

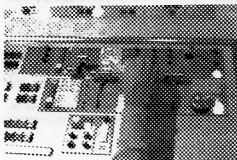
- 2 Ampex quad 2" video tape recorders (VR-1200 "B" with EDITREC and "C")
- 2 IVC 800 series one-inch color video tape recorders



- 1 Ampex one-inch video tape recorder
- 1 CVS 504 time base corrector
- Grass Valley proc amp.
- EIAJ color and black and white VTR's
- 3/4" color cassette recorders
- Sarkes-Tarzan video switcher/effects generator
- Neve 15 channel audio console
- 2 16mm, super 8 or 35mm slide color film chain units
- Revox half-track audio tape recorders
- Datavision D-3000 character Generator
- Monitoring and test equipment

### 3 POST-PRODUCTION STRATEGIES

The Post-Production Program can be of the greatest service to the largest number of artists if we look at the video activity of the whole state. Quite a number of good editing systems exist for users of half-inch and three-quarter inch tape. The technology in these formats have yielded surprisingly good results with regard to color, signal-to-noise ratio, resolution, and vertical interval editing. A tape edited on



a good half-inch or three-quarter inch system can usually be time base corrected to two-inch intact, particularly if several precautions are observed. The use of a processing amplifier for sync reshaping and proper levels, high quality tape stock, minimized skew error and good stable originals are just a few. Adjusting the video cross-over point identically on all machines used in recording originals is also important to good time base correction of the half or three-quarter inch edit. Under these conditions the time base corrector will not only output a broadcast stable signal, but will clean up most of the "flags" or "flashes" that sometime occur in the first frame after many edits. This error results from the random mismatch of odd and even fields during an edit. If the problem is not cleared up or if other bad edits persist from the lower format, a new insert edit only over those edits which fail can be laid in once it has been transferred to two-inch.

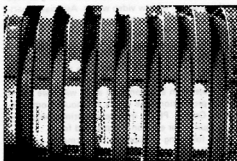
At this point it is possible to add titles, film, or slides, mix and re-equalize sound and perform any number of tape-to-tape effects. An "A" and "B" roll can be thus built on the half-inch or three-quarter

inch system using a stop watch or time code generator before ever entering the quad studio in Newhouse. Upon arrival one roll is transferred to two-inch through the time base corrector. It is then played back into the video board along with the other roll which is simultaneously being time base corrected from the lower format and entered into board.

There are several advantages to the use of smaller format systems to assemble the basic picture and sound sequence. Greater accessibility and geographical distribution, "hands-on" control of the machines (our engineer performs the edits on two-inch) automated machine interfaces in some instances and several new design features in the lower formats make this method quite attractive. For instance, on many half-inch and three-quarter inch VTR's switching between audio and video insert, audio only and video only can be done while in the record (edit) mode. On our two-inch VTR's even a good audio insert was never designed into the technology.

In trying to best serve the needs of artists throughout the state, there is clear advantage in evolving a program that looks at the existing availability of

small format editing. As more and more of the basic audio and video edits are performed on these smaller systems, more people can utilize the really sophisticated capabilities of the Post-Production Program. As requests for time begin to exceed availability, we plan to give preference to those projects which take best advantage of both small format editing systems and the extended technology at the Newhouse Center.



### 4 SOFTWARE RIGHTS AND TAPE COPIES



All rights to the video productions which are made using the production and post-production programs belong to the visiting artist with the following stipulation: Copies of the tape will be kept in the Synapse tape library for educational or public access use on cable television systems within New York State. The master edit will usually be kept by Synapse so that a reasonable number of duplicates can be requested by the artist. A nominal fee will be charged for large or frequent duplication requests, as these take away from production time. In cases where the artist may wish to purchase the master edit, provisions will be made for Synapse to obtain the tape periodically to make replacement copies.

One-half inch or three-quarter inch duplicate of the master will be provided by Synapse for artists in the Watson Color Studio Production Program only; post-production artists must provide personal duplicates. Worktape originals or copies may be purchased by artists in both programs.

Most importantly, we encourage widespread distribution and understanding of high quality innovative video work. For those who do not seek to generate a product as their primary piece, we favor an openness to careful documentation or the establishment of a context which makes their work comprehensible over broadcast or cablecast media. Our intention is to make all works from the production or post-production programs available for at least one public television viewing. This is, of course, a preference, and is not mandatory in every case.

As a publicly financed program we believe that a plan of at least minimal accessibility is essential to everyone's continued growth. Please contact us with any questions about the program.



## 5 A NOTE OF CAUTION

Production and post-production time should be scheduled well in advance of committed dates for broadcast, installation or exhibition of the work to be completed at Synapse. We reserve the right to cancel any production sessions which may be adversely affected by the presence of deadlines to which the artist has agreed. It is difficult enough for us to schedule as many projects as possible and still leave a time period as a buffer against production overruns. A lack of familiarity with our facilities and procedures, problems with original video material, breakdowns of our equipment and errors in planning are just a few of the factors which could push the completion date back.

Our ability to estimate the time necessary for each project can only be as accurate as the information supplied. After accepting the proposals according to the selection guidelines below, we will ask each artist for more detailed information. In the case of color studio production artists, each will be asked for a complete script including a plan for making in-studio decisions where several alternatives need to be considered. For post-production artists, it is necessary to submit either a script or a rough edit accompanied by



a precise listing of effects, titles, film, etc., and their running time. With this information we can more clearly estimate the time needed to complete each project.

In addition, it may be necessary for post-production artists to bring personnel to assist them, depending on the complexity of their tape. If more than two VTR's or several slides are needed at one time along with the character generator, audio and video boards, the services of that many more people may be required. The Synapse staff production assistant will serve as liaison between artist and engineer, as well as performing the production function most valuable to the artist, usually audio or video mixing.

Send inquiries or call:

Bob Burns	Henry Baker
Carl Geiger	Carolyn Broquet
Lance Wisniewski	Mary Sabolik

Synapse Artist Visitation Program  
316 Waverly Avenue  
Syracuse, New York  
315-423-3100

THE SYNAPSE ARTIST VISITATION PROGRAM  
IS MADE POSSIBLE WITH SUPPORT FROM  
THE NEW YORK STATE COUNCIL ON THE ARTS  
AND SYRACUSE UNIVERSITY UNION.

PORTIONS OF OUR MAILING LIST HAVE BEEN  
PROVIDED BY C.A.P.S. AND THE KITCHEN.

Name \_\_\_\_\_ Telephone \_\_\_\_\_

Address \_\_\_\_\_

I am submitting proposals for: ☐ Color Studio Production Program ☐ Post-Production Program

Please list the supporting materials accompanying this form \_\_\_\_\_

If you would like the outcome of your piece to end up as finished and edited tape, indicate the format desired:

Two-inch broadcast quality; One-inch; Three-quarter inch; Half-inch; other: \_\_\_\_\_

Signed \_\_\_\_\_ Date \_\_\_\_\_

# HARPO DESCRIPTION AND OPERATING INSTRUCTIONS

First four letters of this file's name: HARD.

Dated: February 14, 1977, happy Valentine's Day.

## HARPO OPERATING INSTRUCTIONS

### 1. WHAT HARPO WAS DESIGNED TO DO

The basic idea with HARPO was to allow someone with only a marginal knowledge of computer concepts to control video effects in an accurate, fast, and repeatable manner. In essence, the user probably needs either much knowledge of much knowledge of computer concepts to succeed. The video effects are created by a sequence of control voltages applied at specified time intervals to video hardware through digital to analog converters (DACs). Digital control instructions can also be specified, to control things like switchers. HARPO also can sample the analog world and store what it finds there for later use.

### 2. WHAT HARPO IS

HARPO is a type of computer program known as an INTERPRETER. It is an interpreter written in assembly language for 8080 microprocessor based computers, a type relatively cheap and available. The commands and scores which HARPO interprets are a more general language which is designed with video effects in mind.

### 3. HOW USERS COMMUNICATE WITH HARPO

HARPO can operate in two modes. As an INTERACTIVE interpreter, HARPO accepts commands the user enters from a keyboard and executes the commands immediately. In SCORE mode a list of commands (a SCORE) is specified ahead of time using another computer program called an EDITOR. The user then can tell HARPO to interpret the SCORE he has created. The SCORE can be saved and reexecuted later. Most command lines are interpreted identically in both modes, but in SCORE mode, command lines can be interpreted much faster than a user could type. This allows rapid changes in signals controlling video hardware, which is what video effects usually consist of. In addition, the user

# HARPO DESCRIPTION AND OPERATING INSTRUCTIONS

page 1

can talk to HARPO via an analog port by using the SAMPLE or INWAVE commands.

## 4. HOW WE HAVE USED HARPO SO FAR

In our imaging system we use HARPO to control 13 DACs, which in turn direct various analog devices. We also use HARPO to control a switcher, and to provide precise timing for our effects. We usually work in this sequence: We decide what we want our effect to look like, and what the time relationships are to be. Then we think about how we could produce these images using the video hardware we've got. Then if these pieces of hardware need to be controlled precisely, or quickly, or if there are more things to control than we have hands, or some combination of these, then we turn to HARPO to execute a series of commands to do these things. We can easily try out various pieces of the puzzle in interactive mode. Then we have to write a SCORE (a list of commands) with the EDITOR program, and make all the necessary matches between the computer and the video hardware. HARPO interprets the score, controls the video hardware, and we tape the results. Often while HARPO is controlling part of the hardware needed for the effects, we are controlling other devices manually, because many effects are more easily controlled by hand than by machine. Typically our first attempts are lousy, and we have to re-edit the score (again using the EDITOR) and have HARPO try again with the revised score.

## 5. WHAT HARPO COMMANDS LOOK LIKE

HARPO commands are generally in the form:

<LABEL: COMMAND ARGUMENTLIST ; COMMENT>

where all four sections (label, command, argument list, and comment) are optional. Labels must be followed by a colon for HARPO to know they are labels, and are useful only in SCORE mode. Commands are the verbs of the system and are described below. Argumentlists specify additional information for the commands, and may include punctuation and prepositions in a feeble attempt to make the commands more like English sentences. Comments must begin with a semicolon and do not cause any action. They are used only to clarify what is happening in the score or command. (A few points about form are appropriate here: In HARPO, multiple spaces are treated as one space, and tabs are treated as spaces. Also, a line need not contain a command: it could be blank or just be a comment. Command lines

are terminated by carriage return characters, and commas are acceptable delimiters for arguments in an argument list. Blanks serve the same purpose as commas.)

Let's define a few terms:

<LETTER>: A thru Z, upper case only please

<DIGIT>: 0 thru 9.

<NUMBER>: a series of digits. All numbers in HARPO are decimal, and can have values from about -32,000 to +32,000.

<NAME>: a series of letters and/or digits which begins with a letter and has no embedded spaces. Only the first five characters are significant; that is, <NAME> and <NAME\$AKE> may look different to you, but HARPO thinks they're the same thing.

<EXPRESSION>: any number of numbers or names

separated by either +, -, \*, or /. (See FQOS-II manual for more.)

<FILENAME>: a file name in the standard format for our system. (See FQOS-II manual for more.)

#### WHAT EACH COMMAND LOOKS LIKE

Command name: STROB

Format: STROB VALUE TO DEV#

What happens: The expression VALUE is output (strobed, if you will) to the address which is the value of the second expression DEV#.

Command name: START

Format: START

What happens: All DACs are STROBED so they will output their lowest voltage readings. Digital devices have zero sent to them.

Command name: TOPStart

Format: TOPStart

What happens: All DACs are STROBED so that they will output their highest voltage readings.

Command name: MIDStart

Format: MIDStart

What happens: All DACs are STROBED so that they will output a middle readings.

Command name: **OUTABLE**

Format: **OUTABLE\_DEV#\_FILENAME\_#CYCLES\_RATE**

What happens: This is the most complex command so far. First the concept of wavetables: if we had a complex wave form which we had created or collected with another program and saved as a data file on diskette, we would call this a wavetable. It is a series of numbers which if output to a DAC or some other device will produce some desired effect. The idea of this command is to send such a wave of numbers out to a device. **DEV#** is an expression which is evaluated as the output address. **FILENAME** is the name of the file which contains the wave. **HARPO** will bring

this wavetable into memory in preparation for outputting it, if it's not already in memory. Then, assuming a **WAITFor** command is not in control, it will immediately start outputting (STORing really) one point of the wave for every interval specified by the **RATE** expression. Rates are specified in terms of a standard interval, usually 1/60th second. When each point in a wavetable has been output, a "cycle" is completed. The expression **#CYCLES** says how many times each wave will be outputted to the DAC. For example, if the **#CYCLES** is 3, then if nothing else stops **HARPO**, it will output the specified wave 3 times as a result of this command. If another wave is currently being output to this same DAC by a previously interpreted **OUTABLE** or **RAMP** command, this wave replaces the former wave or ramp. If a **STROBE** command addresses a DAC which is having a wave output to it, the **STROBE** will appear as a glitch in the wave. Rates are usually specified in multiples of 60th of seconds, but an external device can also control the rate. Talk to Rod about this if you're interested.

Command name: **RAMP**

Format: **RAMP\_dDEV#\_START\_STEP\_FINISH\_RATE**

What happens: A linear ramp will be output to the expression **DEV#**, beginning with expression **START**. Points in the **RAMP** will differ by expression **STEP**, and the ramp's final point will be the expression **FINISH**. Expression **RATE** determines the number of vertical intervals between each point. The **RAMP** command cancels any previously active **OUTABLE** or **RAMP** command to the device being dealt with. Standard non-linear ramps are available for use as waves with the **OUTABLE** command.

Command name: **STOP**

Format: **STOP\_DEV#**

What happens: This command cancels the effect of any **OUTABLE** or **RAMP** command to the device specified by the expression **DEV#**. If there is currently nothing happening to that device then it has no effect.

Command name: READWave

Format: READWave\_FILENAME

What happens: If the wave specified by FILENAME is not already loaded into memory it is brought in by this command. This allows you to do the time consuming job of reading the wave into memory from diskette at a slack time in a score. Then when you are ready to OUTAB the wave, it will already be in memory and will be output much sooner. Typically the READWave command would be used at the beginning of a score, before the effect has begun, or during a WAITFor of fairly long duration, say of 1/2 second or longer. All computers, including this one, work much faster than the mechanical devices which they depend on. The process of moving information (waves in this case) from the mechanical world of the diskette to the totally electronic world of the computer can slow down HARPO to the point where things just don't happen at the rates we want. READWave allows us to do the slow jobs at non-crucial times.

Command name: READScore

Format: READScore\_SCORENAME

What happens: The SCORE specified by SCORENAME (in FDOS format) is read into memory and interpretation of that score begins. The score currently being executed, if any, is aborted, and cannot be restarted without another READScore command. This command can be used while in interactive mode to begin interpretation of a score, or in score mode to allow one score to start interpretation of another score. If this is the case (what a construction), all waves previously in memory are erased, and all symbols defined by SET\_TO commands are now undefined. If they are to be used in the next score they will have to be redefined.

Command name: END

Format: END

What happens: If you're in SCORE mode, HARPO returns to interactive mode. If you're already in interactive mode, nothing happens. Also, you have to have an END statement at the end of your score. Don't forget.

Command name: EXIT

Format: EXIT

What happens: HARPO reloads and releases control to the FDOS executive (prompt character '!'). This is the only way to return to the operating system. "C" doesn't work because of loose ends left interrupting you every field time.

Command name: WAITFor

Format: WAITFor.EXPRESSION

What happens: This command provides for delays; it waits for the value of EXPRESSION number of intervals (usually 60ths of seconds). For example, WAITFor\_60 delays for a second, WAITFor\_NDLS \* 3600 waits for NDLS minutes. WAITFor only causes delay of commands which output values to devices. The commands affected are:

STROBE, START, TOPStart, MIDStart, OUTABLe (but see below), RAMP (but see below), STOP, READScore, EXIT, and WAITFor.

OUTABLes and RAMPs which are happening when the WAITFor is interpreted continue undelayed; no new OUTABLes are begun. All commands other than those in the list above are interpreted without delay, since they will not affect the effect. With the RAMP and OUTABLe commands interpretation is continued as far as possible, up to the point of actually outputting a value to a DAC. This means the time consuming task of moving the wave from diskette to memory is done during the dead space of the WAITFor command.

Command name: SET.TO

Format: SET.NAME.TO.EXPRESSION

What happens: The EXPRESSION is evaluated and assigned to the NAME. Assignment statements are basic statements in most computer languages, and allow us to deal with names instead of numbers. For example, if we are controlling a color encoder with one of our DACs, we can refer to that DAC with the name of the color input instead of it's DAC number. Say we plug the cable from DAC 5 into the red encoder input. Then the command SET\_RED.TO.5 at the beginning of the score allows us to STROB values to RED instead of an obscure 5.

Command name: INCREment

Format: INCREment.NAME

What happens: INCREment.NAME has the same effect as SET.NAME.TO.NAME+\_1.

Command name: DECREment

Format: DECREment.NAME

What happens: DECREment.NAME has the same effect as SET.NAME.TO.NAME-\_1.

Command name: IF.THEN

Format: IF\_EXPRESSION\_THEN\_COMMAND

What happens: EXPRESSION is evaluated. If the value of EXPRESSION is zero, HARPO continues to the next line, ignoring COMMAND. If EXPRESSION is non-zero, COMMAND is interpreted. COMMAND (which must be on the same line as THEN) can be any command. The IF\_THEN construct is also a basic one to most computer languages. It allows decision making to be a part of scores.

Examples:

```
IF_1_-_1.THEN_STOR_5_5 ; NOTHING HAPPENS HERE.  
IF_20.THEN_GOTO_HOME   ; CONTROL WILL ALWAYS PASS  
                        ; TO THE COMMAND LINE WITH LABEL "HOME"
```

Command name: GOTO

Format: GOTO\_LABEL

What happens: Useful only in SCORE mode, this command causes HARPO to start interpreting at the command line identified by LABEL.

Command name: LIST

Format: LIST

What happens: Useful if you're in SCORE mode, LIST causes each command line to be displayed on the console device as it's interpreted. This will slow things down considerably, but can give you a handle on what's going on with your score.

Command name: NOLIST

Format: NOLIST

What happens: This command turns off the LIST command. NOLIST is the default condition: it's what you set when you first RUN HARPO.

Command name: STEP

Format: STEP

What happens: Useful only in the SCORE mode, this command allow you to step through a score. After STEP is interpreted, the space bar on the console device must be depressed before each command line is interpreted. Use this command to "debug" a score.

Command name: NOSTEP

Format: NOSTEP

What happens: This command undoes the STEP command. The default condition is NOSTEP.



Command name: SHOW

Format: SHOW 'STRING'

What happens: The STRING enclosed in single quotes is displayed on the console device. If the second quote is followed by a carriage return and linefeed are also displayed.

Command name: PAUSE

Format: PAUSE

What happens: This command is equivalent to the sequence of commands:

SHOW 'ARE YOU READY?'

STEP

NOSTEP.

ICOM FDOOSII 2.0

Command name: NOLIST

Format: NOLIST

What happens: This command turns off the LIST command. NOLIST is the default condition; it's what you get when you first RUN HARPO.

Command name: STEP

Format: STEP

What happens: Useful only in the SCORE mode, this command allow you to step through a score. After STEP is interpreted, the space bar on the console device must be depressed before each command line is interpreted. Use this command to "debug" a score.

Command name: NOSTEP

Format: NOSTEP

What happens: This command undoes the STEP command. The default condition is NOSTEP.